

Application No. 09/685,412
Reply to Office Action of April 2, 2004

Atty. Docket No. 202709US-6541-6541-6

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A GPS positioning method, comprising the steps of:
acquiring high precision frequency information provided by a standard wave;
measuring an oscillation frequency of a reference oscillator used in a GPS receiver
section or a frequency variation of the oscillation frequency using the received high-precision
frequency information;
utilizing the result of the measurement to ~~each~~ acquire a signal from a GPS satellite;
acquiring high precision time information provided by the standard wave; and
performing a positioning arithmetic operation using the high precision time
information in place of time information sent from said GPS satellite.

Claim 2 (Canceled).

Claim 3 (Previously Presented): A GPS positioning method according to claim 1,
further comprising:

a first step of detecting a synchronization timing regarding a spread code of a spread
spectrum signal from said GPS satellite to detect a time component shorter than one period of
the spread code for time synchronization; and

a second step of detecting, after the synchronization of the spread code is completed
in the first step, a time at a boundary of one period of the spread code from the high precision
time information provided by the standard wave and detecting a time component longer than
one period of the spread code for the time synchronization based on the time of the boundary.

Application No. 09/685,412
Reply to Office Action of April 2, 2004

Atty. Docket No. 202709US-6541-6541-6

Claim 4 (Previously Presented): A GPS positioning method according to claim 1, further comprising:

a first step of detecting a synchronization timing regarding a spread code of a spread spectrum signal from said GPS satellite to detect a time component shorter

than one period of the spread code for time synchronization; and

a second step of detecting, after the synchronization of the spread code is completed in the first step, a boundary of a bit of information from said satellite, detecting the time of the boundary of the bit with the high precision time information provided by the standard wave and detecting a time component longer than one period of the spread code for the time synchronization.

Claim 5 (Original): A GPS positioning method according to claim 1, wherein, even when power to said GPS receiver section is off, power is kept supplied to said frequency oscillator of said GPS receiver section so that the frequency of said frequency oscillator or a frequency variation of the frequency is measured using the high precision frequency information provided by the received standard wave.

Claim 6 (Currently Amended): A GPS positioning method according to claim 1, wherein the measured oscillation frequency of said reference frequency oscillator or the measured frequency variation of the oscillation frequency is reflected on an output signal of a carrier generator of a costas loop for catching acquiring a signal from said GPS satellite.

Claim 7 (Currently Amended): A GPS positioning method according to claim [[1]] 5 wherein the measured oscillation frequency of said reference frequency oscillator or the

Application No. 09/685,412
Reply to Office Action of April 2, 2004

Atty. Docket No. 202709US-6541-6541-6

measured frequency variation of the oscillation frequency is reflected on an output signal of a carrier generator of a costas loop for ~~catching~~ acquiring a signal from said GPS satellite.

Claim 8 (Currently Amended): A GPS reception apparatus, comprising:

a GPS receiver section ~~for receiving~~ configured to receive a radio wave from a GPS satellite to perform positioning arithmetic operation;

a standard wave receiver section ~~for receiving~~ configured to receive a standard wave to acquire high precision frequency information;

a frequency measurement section ~~for measuring~~ configured to measure an oscillation frequency of a reference frequency oscillator used in said GPS receiver section or a frequency variation of the oscillation frequency using the high precision frequency information acquired by said standard wave receiver section;

said GPS receiver section utilizing a result of the measurement by said frequency measurement section to ~~catch~~ acquire a signal from said GPS satellite;

said standard wave receiver section acquires high precision time information and supplies the high precision time information to said GPS receiver section; and

said GPS receiver section performs positioning arithmetic operation using the high precision time information in place of time information sent thereto from said GPS satellite.

Claim 9 (Canceled).

Claim 10 (Previously Presented): A GPS reception apparatus according to claim 8, wherein said GPS receiver section includes:

reception means for receiving a radio wave from said GPS satellite;

Application No. 09/685,412
Reply to Office Action of April 2, 2004

Atty. Docket No. 202709US-6541-6541-6

storage means for storing at least trajectory information of said GPS satellite;
synchronism detection means for detecting synchronism of a spread code of a spread spectrum signal wave from said GPS satellite received by said reception means; and
time synchronism detection means for determining a synchronism time point detected by said synchronism detection means as a time component shorter than one period of the spread code for time synchronization, acquiring a time at a boundary of one period of the spread code using the high precision time information from said standard wave reception section, determining a time component longer than one period of the spread code for the time synchronization based on the acquired time of the boundary and establishing the time synchronism.

Claim 11 (Currently Amended): A GPS reception apparatus according to claim [[9]] 8, wherein said GPS receiver section includes:

reception means for receiving a radio wave from said GPS satellite;
storage means for storing at least trajectory information of said GPS satellite;
synchronism detection means for detecting synchronism of a spread code of a spread spectrum signal wave from said GPS satellite received by said reception means;
bit boundary detection means for detecting a boundary of a bit of information from said satellite; and
time synchronism detection means for determining the synchronism time point detected by said synchronism detection means as a time component shorter than one period of the spread code for time synchronization, acquiring a time of the boundary of a bit detected by said bit boundary detection means using the high precision time information from said standard wave reception section, determining a time component longer than one period of the

Application No. 09/685,412
Reply to Office Action of April 2, 2004

Atty. Docket No. 202709US-6541-6541-6

spread code for the time synchronization based on the acquired time at the boundary and establishing the time synchronism.

Claim 12 (Original): A GPS reception apparatus according to claim 8, wherein, even when power is off to said GPS receiver section, power is supplied to said frequency oscillator and said frequency measurement section measures the oscillation frequency of said frequency oscillator or the frequency variation of the oscillation frequency using the high precision frequency information acquired by said standard wave reception section.

Claim 13 (Original): A GPS reception apparatus according to claim 8, wherein the oscillation frequency of said reference frequency oscillator or the frequency variation of the oscillation frequency measured by said frequency measurement section is reflected on an output signal of a carrier generator of a costas loop for catching acquiring a signal from said GPS satellite.

Claim 14 (Currently Amended): A GPS reception apparatus according to claim [[8]]
12, wherein the oscillation of frequency of said reference frequency oscillator or the frequency variation of the oscillation frequency measured by said frequency measurement section is reflected on an output signal of a carrier generator of a costas loop for catching acquiring a signal from said GPS satellite.

Claim 15 (New): A GPS reception apparatus, comprising:
a GPS receiver section configured to receive a radio wave from a GPS satellite to perform positioning arithmetic operation;

Application No. 09/685,412
Reply to Office Action of April 2, 2004

Atty. Docket No. 202709US-6541-6541-6

a standard wave receiver section configured to receive a standard wave to acquire high precision frequency information;

a frequency measurement means for measuring an oscillation frequency of a reference frequency of said GPS receiver section or a frequency variation of the oscillation frequency using the high precision frequency information acquired by said standard wave receiver section;

said GPS receiver section utilizing a result of the measurement by said frequency measurement means to acquire a signal from said GPS satellite;

said standard wave receiver section acquires high precision time information and supplies the high precision time information to said GPS receiver section; and said GPS receiver section performs positioning arithmetic operation using the high precision time information in place of time information sent thereto from said GPS satellite.